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SOUTHERN CALIFORNIA PARTYBOAT ANGLER SURVEY

by

A. Rucker Hartmann

ABSTRACT

Previous studies suggest that ocean anglers are unable to identify many common marine fishes and that they frequently use nondesignated common names for those fishes with which they are familiar.

This paper discusses the ability of the anglers and crew aboard commercial passenger fishing vessels (CPFV) to identify 22 fishes caught off southern California and relates this ability to fishing experience and frequency. Implications to resource management are also discussed.

Most CPFV anglers were inexperienced and could identify only a few of the species. However, as experience increased, the scores improved. Vessel crew members scored higher than the most experienced anglers.

The inability of anglers to identify marine fishes and the widespread use of nondesignated and often confusing common names help to explain why some fishery management regulations of the California Department of Fish and Game are relatively ineffective.

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INTRODUCTION

The successful management of the many California fisheries depends upon angler compliance with fishery management regulations. Such compliance is not possible unless anglers can identify all regulated species using the designated common names in the sportfishing regulations. To insure uniformity in records and publications and to standardize the use of common names among anglers, the California Department of Fish and Game has designated common names for most fishes occurring in California waters (Gates and Frey 1974).

Many Commercial Passenger Fishing Vessel (CPFV) anglers are confused by the use of common names which differ from those officially designated by the California Department of Fish and Game. A single species of fish is often known by several non-designated common names. These are particularly inappropriate when they confuse the true taxonomic position of a species. For example, the brown rockfish, is referred to as a "chocolate bass," "P.D. bass," or "brown bass." Another rockfish, the bocaccio, is referred to as a salmon grouper. This species is neither a salmon nor a grouper. To further complicate the situation, the same common name is often used when referring to several different species. The name "tomcod" refers to the white croaker in southern California and to the bocaccio in the Monterey area.

To assist ocean anglers in correctly identifying the many sport species which they may encounter, the Department has made a number of identification aids available. The most recent and complete aid is the Guide to the Coastal Marine Fishes of California (Miller and Lea 1972).

Despite the availability of regulation booklets and aids to the

identification of ocean fishes, many anglers are having difficulty complying with fishery management regulations. Field surveys conducted by the Southern California Independent Sportfish Survey (SCISFS) from 1975 through 1978 at launch ramps, hoists, and boat rental facilities indicate that many anglers keep undersize sportfish (Wine 1978, 1979a, 1979b). This violation of sportfishing regulations may be due to several factors.

1) Intentional disregard of regulations
2) Ignorance of regulations
3) Inability of anglers to identify regulated species
4) Use of non-designated common names which do not appear in the regulation booklet.

Results of a preliminary survey of the ability of fishermen on private boats and piers in southern California during September-October 1979, to identify 18 commonly caught sportfish indicate that inability of anglers to identify the fishes in their catch and the use of non-designated common names are major causes of non-compliance with regulations (Wine 1979c).

At present, rockfish management regulations require that anglers identify rockfish to the generic level only. However, the Pacific Fisheries Management Council Groundfish Plan proposes to manage certain rockfish species individually. This plan would require anglers to identify at least some rockfishes to species. Because rockfishes are a taxonomically complex group with many look-alike species, it may be unrealistic to expect anglers to differentiate among them.

From April through December, 1978, anglers and crew aboard Commercial Passenger Fishing Vessels were surveyed to

1) Determine the composition of CPFV anglers and crew in terms of angling experience and frequency,

2) Determine the relationship between angling experience and frequency, and the ability to identify 22 species of common marine sportfishes with emphasis on rockfishes,

3) Determine how compliance with California Department of Fish and Game management regulations may be affected by the inability of anglers to identify the species they catch,

4) Compile a list of non-designated common names currently used aboard CPFV's and assess how these may complicate fish identification for anglers.

METHODS

The survey was part of an investigation of the southern California CPFV's conducted from 1975 through 1978. Field personnel of this study sampled the catch of CPFV trips at all ports from San Diego to Santa Barbara. They attempted to survey a maximum of 10 randomly selected anglers per trip in addition to their regular duties. Skippers and deckhands were also surveyed.

CPFV anglers are generally given consecutively numbered fish sack tags after they board a vessel. Samplers selected the first 10 numbers below the total passenger count from a table of random digits and interviewed the anglers who held the tags bearing those numbers. If there were less than 10 anglers aboard, all were surveyed. Because most of the interviews were conducted on the way to and from the fishing grounds, it was often impossible to complete 10 interviews on short trips.

Once selected, anglers were asked how many years they had fished aboard CPFV's in southern California waters, and the approximate number of CPFV trips they took annually. They were then shown 22-7" x 10" color photographs of marine sportfish and were asked to identify

each using any name with which they were familiar. All photos were of freshly caught, live fish to assure proper coloration. If unable to identify the fish, anglers were asked to specify a larger subgroup to which they felt the fish belonged (e.g. rockfish, bass family, perch family). However, they were not presented with a list of choices from which to select a name.

Included in the survey were 12 species of fishes that are generally caught between late spring and winter and occur in the near-shore environment. Four of these have size limits:[1/] California barracuda, *Sphyraena argentea;* kelp bass, *Paralabrax clathratus;* barred sand bass, *P. nebulifer;* white seabass, *Atractoscion nobilis.* The remaining 8 species were Pacific mackerel, *Scomber japonicus;* Pacific bonito, *Sarda chiliensis;* white croaker, *Genyonemus lineatus;* ocean whitefish, *Caulolatilus princeps;* lingcod, *Ophiodon elongatus;* cabezon, *Scorpaenichthys marmoratus;* sculpin, *Scorpaena guttata;* and halfmoon, *Medialuna californiensis.*

Rockfishes are found in a wide range of ocean depths and are most often caught during winter months when surface species become less available to anglers. Ten of the species included in the survey were olive rockfish, *Sebastes serranoides;* blue rockfish, *S. mystinus;* bocaccio, *S. paucispinis;* chilipepper, *S. goodei;* cowcod, *S. levis;* vermilion rockfish, *S. miniatus;* flag rockfish, *S. rubrivinctus;* greenspotted rockfish, *S. chlorostictus;* copper rockfish, *S. caurinus;* and brown rockfish, *S. auriculatus.*

RESULTS

Passengers

Angling Experience and Frequency

Eight hundred fifty-six anglers were interviewed during 167 fishing trips occurring from June 1978 to December 1978 and the composition of

[1/] At the time this survey was administered the lingcod had no legal size limit. In 1980, a 22" size limit was placed on this species.

this angler population was determined in terms of angling experience (the number of years fished per angler) and frequency (the average number of trips per year per angler) (Table 1).

Those who fished regularly had a higher probability of being selected for interview than others. To correct for this "frequency of use" bias (Sinclair and Morley 1975), the data from the interviews were summarized by frequency category and weighted by the reciprocal of the group's relative probability of being selected for interview. Unweighted data are also included.

Results indicate that a majority of the anglers are inexperienced; 83% fished at a frequency of only 5 times or less per year (Table 1; y); and 36% had less than one year fishing experience (Table 1; a). Most anglers (56%) had less than five years of experience and fished one-five times per year (Table 1; a & g).

The unweighted data indicate that a fairly large number of anglers aboard CPFV's spend a lot of time at sea. For example, 27% fished 30 or more times per year. However, when the data are corrected for "frequency of use" bias, the ardent anglers made up only 3% of the total (Table 1; C).

The angler population consists of a large number of individuals who are relatively inexperienced and who fish infrequently, and a small number of more experienced, ardent anglers.

The average scores achieved by anglers in each of the 20 experience/frequency categories were calculated and, as expected, the ability of the anglers to identify fishes increased as the number of years and the number of trips per year increased (Table 2). One significant exception occurred among anglers who fished for more than 10 years and more than 10 times

TABLE 1. Percentage of Anglers in 20 Experience/Frequency Categories-(Raw) and Weighted Based on 856 Interviews.

Years Fished (Experience)	No. Trips per year (Frequency) 1-5	6-10	11-20	21-30	30+	All Frequency Categories
	a	b	c	d	e	f
<1	35.6 (19.3)	0.6 (0.8)	0.1 (0.4)	0.1 (0.2)	0.1 (0.8)	36.5 (21.5)
	g	h	i	j	k	l
1-5	20.3 (11.0)	3.1 (4.4)	1.0 (2.7)	0.3 (1.4)	0.7 (6.1)	25.4 (25.6)
	m	n	o	p	q	r
6-10	9.1 (4.9)	1.3 (1.9)	0.6 (1.6)	0.2 (0.8)	0.4 (3.7)	11.6 (13.0)
	s	t	u	v	w	x
10+	18.2 (9.8)	4.1 (5.8)	1.8 (5.0)	0.7 (3.0)	1.8 (16.2)	26.6 (40.0)
All Experience Categories	y	z	A	B	C	
	83.2 (45.0)	9.1 (13.0)	3.5 (9.7)	1.3 (5.5)	3.0 (26.9)	

TABLE 2. Average Scores Achieved by Anglers in 20 Experience/Frequency Categories Based on 856 Interviews.

Years Fished (Experience)	No. Trips per Year (Frequency) 1-5	6-10	11-20	21-30	30+	All Frequency Categories
	a	b	c	d	e	f
<1	2.08	6.00	8.00	7.50	6.80	2.49
	g	h	i	j	k	l
1-5	4.43	6.63	6.65	6.66	12.50	7.10
	m	n	o	p	q	r
6-10	5.10	7.56	10.36	12.29	14.38	9.24
	s	t	u	v	w	x
10+	6.06	8.26	8.53	10.46	13.53	10.06
All Experience Categories	y	z	A	B	C	
	3.85	7.46	8.30	9.63	13.16	

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per year (Table 2, u, v, w). The number of correct answers in the three categories comprised of these individuals declined compared to the number of correct answers of anglers who fished as often each year, but who had only 6-10 years of experience (Table 2; o, p, q).

The majority of anglers is not well acquainted with marine sportfish. More than 83%, those who fished one to five times per year, correctly identified fewer than 4 of the 22 fishes chosen for the survey (Tables 1, 2; y). Only 3% of the anglers identified 50% or more of the fishes (Tables 1, 2; k, p, q, w). The highest average score was 14. This was achieved by only 0.4% of the angler population; these fished more than 30 times per year and had from 6-10 years experience (Tables 1, 2; q).

Identification Ability

The ability of anglers to identify each of the 22 fishes on the survey was determined (Table 3), and the answers arranged according to the percentage of correct identifications. This value varied from a high of 85% for the barracuda to a low of 3% for the brown rockfish. Any name that was used commonly by anglers for the fish in question was accepted as a correct answer regardless of whether or not it was a designated common name (Appendix 1). Some anglers were able to specifically identify a fish. However, some anglers could only identify the family or genus to which it belonged and in other cases the identification of a fish was incorrect to species, but the angler did name a species that was within the proper subgroup. Both of these latter types of answers were categorized as "correct subgroup." Fishes with significant percentages of answers in this category were generally members of large or well known subgroups such as croakers, tunas, and rockfishes.

TABLE 3. Percentage of Angler Answers Occurring in Each of Four Categories Based on 856 Interviews.

	1 Correct I.D.	2 Correct Subgroup	3 Incorrect Answer	4 No Answer
Barracuda	84.7	0	4.4	10.9
Pacific mackerel	79.8	4.1	5.8	10.3
Pacific bonito	69.9	13.9	2.1	14.1
Sculpin	66.8	0	11.7	21.5
White croaker	51.6	4.4	16.4	27.6
Kelp bass	49.9	24.3	2.2	23.6
Ocean whitefish	40.4	0	17.1	42.5
Lingcod	37.1	0	24.2	38.8
Cowcod	32.4	30.7	5.8	31.1
Barred sand bass	29.7	19.5	9.5	41.4
Bocaccio	28.6	34.3	6.5	30.5
Flag rockfish	26.5	27.0	4.8	41.7
Halfmoon	25.4	0	27.6	47.1
Vermilion rockfish	22.8	38.4	4.0	34.8
White seabass	22.7	4.3	16.4	56.7
Olive rockfish	21.3	8.2	52.6	18.0
Cabezon	19.5	0	27.7	52.8
Chilipepper	17.3	39.6	4.6	38.6
Blue rockfish	16.1	8.6	33.8	41.5
Copper rockfish	7.6	35.2	11.3	45.9
Greenspotted rockfish	4.6	48.2	3.2	44.0
Brown rockfish	3.3	33.5	14.0	49.2

The number of incorrect answers was highest for fishes such as olive [illegible], blue rockfish, and cabezon; all of which closely resemble species in other subgroups. Incorrect answers ranged from a high of 53% for olive rockfish to a low of 2% for Pacific bonito.

The percentage of anglers who offered no answer was highest for species that are uncommon in the catch, indicating that anglers couldn't identify those fishes which they didn't see often. Values in the "no answer" category ranged from a high of 53% for the white seabass to a low of 10% for the Pacific bonito.

Species with Size Limits. California barracuda, kelp bass, barred sand bass, and white seabass were subject to a legal size limit at the time this survey was administered. Of these, only the California barracuda was correctly identified by more than 75% of the anglers. Accurate identification of the other three was substantially lower. One would expect that those species with a legal size limit would be recognized by a high percentage of anglers, but with the exception of the California barracuda, this was not the case.

California barracuda. The California barracuda, because of its unique appearance and desirability as a sport species was easily recognized and correctly identified 85% of the time. Virtually all anglers who correctly identified it used the designated common name barracuda. Despite its widespread recognition, Wine (1979a) found that only 61% of the barracuda taken by private and rental boats were of legal size. Results of our survey support her conclusion; that most undersize barracuda are kept because fishermen are ignorant of fishing regulations or deliberately violate the law.

Kelp bass. The kelp bass is a desirable sport species with a 12-inch legal size limit. Despite this, it was correctly identified by

one half of those surveyed and 24% called it a bass of some kind. Of those who correctly identified it, 8% used the designated common name kelp bass, 91% used "calico bass" and 1% used "rock bass." Because all regulations refer to this species as kelp bass, anglers who use the names "calico bass" and "rock bass" may be unaware that it has a legal size limit. The widespread misuse of the term bass makes it unlikely that many anglers who referred to this species as a bass were aware of the size limit.

Although only 2% of those surveyed misidentified this species, most who did thought it was a rockfish. Because there is no legal size limit on rockfish, such misidentifications may account for some of the sub-legal kelp bass being kept. Wine (1979a) found that approximately 15% of the kelp bass kept by anglers in the private and rental skiff fleet were undersize.

Barred sand bass. Like kelp bass, the barred sand bass is a desirable sport species with a 12-inch legal size limit. It was correctly identified by 30% of those surveyed and an additional 20% identified it as a bass.

Because fewer anglers correctly identified the barred sand bass than the kelp bass and since barred sand bass make up a smaller percentage of the private boat catch than do kelp bass and therefore are less familiar to anglers, one would expect to find a comparatively higher percentage of undersize barred sand bass in the catch. However, Wine (1979a) found that only 10% of those kept by anglers in private and rental boats were below the legal size limit. This is probably because nearly all anglers who correctly identified the barred sand bass used the name "sand bass" which does appear in the regulations. Use of the designated common name by anglers apparently resulted in less confusion, increasing

dherence to regulations.

Most of those who misidentified the sand bass thought it was a rockfish.

White seabass. Only 23% of those surveyed identified the white seabass correctly, probably because it is not caught frequently. An estimate of the 1978 CPFV catch of this species, which includes both legal and sub-legal fishes, indicates that it made up approximately 0.1% of the total southern California catch that year (Collins, CDF&G, pers. commun.).

Non-compliance with white seabass regulations is a common occurrence among anglers in private and rental boats (Wine 1979a). Prior to March 1, 1978, anglers were allowed one undersize white seabass (less than 28 inches in length). After this date, it became illegal to possess any undersize white seabass, yet only 21% of the fish sampled were legal. Wine (1979a) attributed this to the fact that many anglers called them "sea-trout." Since there are no "sea-trout" regulations, anglers using this non-designated name may believe that the fish they have caught is unregulated.

Results of this survey indicate that the use of the term "sea-trout" is a minor part of the problem. "Sea-trout" was used by only 10% of those who identified it correctly, indicating that this name is not widely used aboard CPFV's. The designated common name was used by the other 90%.

The highest percentage of "no-answers" on the survey was for white seabass with 57% of the anglers unable to even guess a name. Of the 16% who misidentified this species, most used the ambiguous term bass.

The white seabass photograph used in this survey was of a sub-adult fish. These generally have dark markings on their sides which fade

as they mature from a juvenile to an adult and approach legal size.

Rockfish. Ten species of rockfishes were included in the survey. The percentage of anglers who could identify rockfishes correctly at the species level was relatively low, ranging from 3% for brown rockfish to 32% for cowcod (Table 4). The five fishes which proved the most difficult to identify were all rockfishes.

Angler ability to identify fishes as members of the rockfish subgroup was substantially higher than their ability to correctly identify the same fishes to species (Table 4). Ability to identify rockfishes to at least the generic level varied from 25% for blue rockfish to 63% for cowcod.

Ability to identify a particular rockfish to species did not correlate well with the ability to identify the same fish to genus. Although cowcod and bocaccio were ranked number one and two, respectively, in both categories, the rank order of the remaining eight rockfishes varied considerably.

Color is apparently an important character in identifying rockfish. Red colored species were most often recognized as rockfishes. Even though anglers were unable to identify a particular rockfish to species, they were likely to identify it as a member of the rockfish subgroup if it was red. The greenspotted rockfish, a red colored species, was correctly identified by only 5% of the anglers. However, over 50% could identify it as a rockfish.

The designation of red colored fishes as rockfish is probably due to the fact that the most abundant rockfish in the catch, the bocaccio, and the most desirable rockfishes, the cowcod and the vermilion rockfish are red. As a result, anglers tend to associate the color red with rockfishes even though they can't identify the individual species.

TABLE 4. Percentage of Answers Correct to Genus and to Species for 10 Rockfishes, Based on 856 Interviews.

		Correct to Genus	Correct to Species
Red	Cowcod	63.1	32.4
	Bocaccio	62.9	28.6
	Vermilion rockfish	61.2	22.8
	Chilipepper	56.9	17.3
	Flag rockfish	53.5	26.5
	Greenspotted rockfish	52.8	4.6
Non-red	Copper rockfish	42.8	7.6
	Brown rockfish	36.8	3.3
	Olive rockfish	29.5	21.3
	Blue rockfish	24.7	16.1

When the incorrect answers for rockfish are placed in five categories, it is again clear that color is the main character used to identify fishes as members of the rockfish subgroup. The four species which have little or no red pigmentation were misidentified as bass by many anglers. However, red colored species were rarely called bass (Table 5).

Cowcod. Cowcod, although contributing less than one percent of the CPFV catch (Collins, CDF&G, pers. commun.), is probably the most desirable rockfish due to its large size; many exceed 30 pounds. The large size, the deeply incised dorsal spines and the large head explain why the cowcod was the most widely recognized rockfish on the survey. It was correctly identified by nearly one third of the anglers. All of those who correctly identified this species used the designated common name.

Bocaccio. The bocaccio was the second most widely recognized rockfish on the survey and was correctly identified by 29% of the anglers. Only 20% of these used the designated common name. The remainder used non-designated common names such as "grouper" or "salmon grouper."

Bocaccio are well known to most CPFV anglers because of their abundance in the catch. Estimates show that bocaccio made up 15% of the total southern California CPFV catch in 1978. Also, it was the most abundant of the rockfishes contributing 37% of the total rockfish catch (Collins, CDF&G, pers. commun.). In addition, its elongate head and extremely large mouth are distinctive, so it is not surprising that angler recognition of the bocaccio was relatively high compared to other rockfishes.

Flag rockfish. The flag rockfish generally contributes a small percentage of the annual CPFV catch (Collins, CDF&G, pers. commun.). Although it is not an especially desirable sport species, it ranked third among rockfishes in terms of angler recognition, with 26% of the anglers

TABLE 5. Percentage of Answers Occurring in 5 Incorrect Categories for 10 Species of Rockfishes Based on 856 Interviews.

		Perch	Bass	Sculpin	Croaker	Misc.
Non-red	Blue rockfish	12.5	19.6	0	0.1	1.5
	Olive rockfish	1.4	50.1	0	0.5	0.6
	Brown rockfish	0.7	12.3	0.5	0	0.6
	Copper rockfish	0.4	10.2	0.4	0	0.5
Red	Greenspotted rockfish	0.1	2.1	0.6	0	0.4
	Flag rockfish	0.6	2.1	0.5	0	1.6
	Chilipepper	1.1	1.9	0.5	0	1.2
	Vermilion rockfish	0.2	1.6	0.6	0.1	1.4
	Bocaccio	0.1	3.6	0.5	0.6	1.8
	Cowcod	0.1	0.9	2.9	0.2	1.6

correctly identifying it. Only 8% of the anglers used the designated common name. The non-designated common name "barberpole," was used by the other 92%. The brilliant orange and white bars which immediately bring to mind its name, make this species easy to identify.

Vermilion rockfish. The vermilion rockfish was correctly identified by 23% of the anglers. The designated common name was used by only 9%, while 91% used the non-designated names "red snapper," "red rockfish," and "red." This species contributed only 2% of the 1978 CPFV catch (Collins, CDF&G, pers. commun.). However, next to the cowcod the vermilion rockfish is probably the most sought-after rockfish. It is popular because its appearance is pleasing to most anglers. Although its color varies from shades of orange to red, it is often a bright scarlet color, making it stand out from other rockfishes. It is a relatively large, wide-bodies species that fights harder than most other rockfishes, and its taste is considered superior.

The color of the vermilion rockfish photographed for the survey was orange-red. If a bright scarlet specimen had been available, the percentage of correct identifications would probably have been higher.

Olive rockfish. The olive rockfish ranked fifth among rockfishes in terms of angler recognition. It was the fourth most abundant rockfish in the 1978 CPFV catch (Collins, CDF&G, pers. commun.). It was correctly identified by 21% of those surveyed which is surprisingly low because it is commonly taken by anglers fishing in both deep and shallow waters.

The low percentage of correct identifications is probably because this species has little angler appeal. It is drab green and has no unusual characteristics. Along the coast, where most are caught, olive rockfish are generally small and rarely attain a length in excess of 350 mm TL

(E. Knaggs, CDF&G, pers. commun.).

Because of its slender body, small mouth, and green color, the olive rockfish resembles the kelp bass. Approximately 50% of the anglers surveyed called the olive rockfish some type of bass and 12% called it a kelp bass. Of the 21% who correctly identified it, 93% used the non-designated name "johnny bass" and only 7% used the designated common name. Many of those who use the name "johnny bass" are probably unaware that this species is a member of the rockfish group.

Chilipepper. The chilipepper was correctly identified by 17% of those surveyed. All used the designated common name. It was the sixth most abundant species in the 1978 CPFV catch making up 6% of the total (Collins, CDF&G, pers. commun.). For this reason, one would expect the chilipepper to be more widely recognized but, like the olive rockfish, the chilipepper doesn't have great angler-appeal and isn't highly sought after.

Because its maximum size is smaller than that of the bocaccio and vermilion rockfish, it is not considered as desirable. Also, it lacks unique characters (such as the bright coloration of the vermilion rockfish or the large mouth and head of the bocaccio) that make it easy to distinguish from other rockfishes. It is never taken in shallow water, so it is familiar only to anglers who fish deep.

Despite many differences, the chilipepper resembles the bocaccio and vermilion rockfishes. Inexperienced anglers and those who fish mainly in shallow water often confuse it with other red colored rockfishes with which they are more familiar. Of those who misidentified the chilipepper, 11% called it a vermilion rockfish and 3% called it a bocaccio.

Blue rockfish. The blue rockfish was correctly identified by only 16% of the anglers. Of these, 23% used the designated common name, 64%

referred to it as a "blue bass" and 12% called it a "priest fish."

The blue rockfish was the fifth most abundant species in the 1978 CPFV catch accounting for 6% of the total (Collins, CDF&G, pers. commun.). One would expect it to be well recognized, but it is considered undesirable by most anglers in southern California because it doesn't attain a large size and doesn't keep well when frozen.

The deep body and small mouth give the blue rockfish a perch-like appearance. It also resembles the halfmoon which is commonly misnamed "blue perch." As a result, 12% of those surveyed called the blue rockfish a perch. Use of the non-designated name "blue bass" probably explains why 20% identified it as a bass.

Copper rockfish. The copper rockfish was correctly identified by only 8% of the anglers. Only 6% of these used the designated common name. The non-designated name "chucklehead" was used by 94%.

The copper rockfish is a rather typical looking rockfish. It is relatively large, heavy-bodied, and fights hard when hooked. Due to its distinctive coloration, it doesn't closely resemble any other species commonly occurring in southern California waters. Despite this, 10% of those surveyed called it a bass.

The low percentage of correct identifications of copper rockfish is probably because few are caught. In 1978 they made up only 1% of the fishes sampled aboard CPFV's (Crooke 1978, 1979a, 1979b, 1979c).

Greenspotted rockfish. The greenspotted rockfish was correctly identified by 5% of the anglers. This low figure is surprising because this fish is common in the deepwater rockfish catch. Of those who correctly identified it, 10% used the designated common name, 56% used the name "bosco and 33% referred to it as a "starry-eye."

The greenspotted rockfish is small and considered a nuisance by anglers trying to catch larger fish such as cowcod, bocaccio, and vermilion rockfish. Unless the more desirable species are unavailable, the greenspotted rockfish is thrown into the bait tanks and used as "cut-bait."

Brown rockfish. The brown rockfish, correctly identified by only 3% of the anglers, was the least-recognized species in the survey. The designated common name was used by 57% of those who correctly identified it. The name "chocolate bass" was used by 25% and the remainder called it "brown bass," "cinnamon bass" or "PD bass." The use of these non-designated names probably explains why 12% of the anglers called the brown rockfish a bass.

The brown rockfish accounted for only 0.2% of the fishes sampled aboard CPFV's in 1978 (Crooke, 1978, 1979a, 1979b, 1979c). It is a plain, brown fish without unique characters and is taken most often during the summer months in shallow water where it generally doesn't attain a very large size. As a result, it is not considered important to anglers who would rather catch larger and more desirable species.

Other species. The catch of these (with the exception of the white croaker and lingcod) is regulated by a bag limit of 10 fish per angler per day. Ability to identify them is therefore not as important as it is for fishes having special size and bag limits. Anglers must only be able to distinguish these from other regulated species and limit the take of each to ten to avoid violating regulations. This can be done without knowing the name of each species.

Pacific mackerel. The Pacific mackerel, probably because it made up a high percentage of the CPFV catch in recent years (Collins, CDF&G, pers. commun.), was the second most widely identified species on the survey,

with nearly 80% of the anglers correctly identifying it. Virtually everyone used the designated common name or called it simply a mackerel. An additional 4% identified it as one of the "tuna-mackerel" family.

The Pacific mackerel population has grown steadily since 1976 and this is reflected in the CPFV catch statistics which show that Pacific mackerel increased from 2% of the total catch in 1976 to 20% in 1978 (Collins, CDF&G, pers. commun.). Although taken in greatest numbers by surface anglers, Pacific mackerel are also taken by rockfish fishermen as an incidental catch in both summer and winter and have been caught by almost everyone who has fished from CPFV's in the past 2 years.

Unfortunately, the Pacific mackerel is not considered desirable by most anglers. It is a relatively small fish and people object to the oily meat and strong taste. Most anglers consider it a nuisance and would prefer to catch other species, so many skippers avoid it unless other species are unavailable.

The Pacific mackerel was called a bonito by 3% of the anglers and a Spanish mackerel by 2%. If size is not considered, the Pacific mackerel and bonito are somewhat similar in appearance. The body shape and fin configuration are comparable although the markings on the dorsal surfaces differ. A 12-inch ruler was included in the survey photographs to give anglers an idea of the relative sizes of the fishes, but those who didn't take it into consideration could easily confuse these two species.

Pacific bonito. The Pacific bonito ranked third in terms of correct identifications with approximately 70% of the anglers recognizing it. An additional 14% were able to assign it to the "tuna-mackerel" family.

The Pacific bonito was the seventh most common species in the 1978 CPFV catch, comprising 5% of the total and is quite well known to most

anglers, particularly those who fish surface waters. It is a large, strong, muscular fish which puts up a good fight when hooked and is therefore considered desirable by most anglers. However, many would rather catch this species than eat it because the meat is oily and strong-tasting when improperly prepared.

Like the Pacific mackerel, the Pacific bonito was often confused with other members of the "tuna-mackerel" family. Apparently many anglers can identify them as tuna-like species even though they can't identify them more closely. The Pacific bonito was misidentified as a Pacific mackerel by 7% of the anglers and as various species of "tunas" by 6%.

Sculpin. The sculpin was correctly identified by nearly 70% of those surveyed. The designated common name was used by 95% and the name scorpion was used by the remainder. The sculpin ranked fourth in the survey which is high for a species that in 1978 accounted for only 2% of the CPFV catch. Apparently, it is widely recognized because it is the most venomous and potentially dangerous fish regularly taken aboard CPFV's. The spines in the dorsal, pelvic, and anal fins are associated with large venom glands. Depending upon the number and severity of the wounds, penetration of these spines into the skin can result in symptoms ranging from localized pain and swelling to nausea, vomiting, and even respiratory distress and heartbeat irregularities (Roche 1973). For this reason, it is in the angler's interest to recognize the sculpin.

Recognition of the sculpin is also enhanced by the wide body, abnormally large pectoral fins and numerous red-brown spots covering the fins and body. It doesn't closely resemble any other species common in southern California waters.

White croaker. The white croaker was correctly identified by

slightly more than half of those surveyed; of these, only 21% used the designated common name, 73% used the name "tomcod," and the remainder referred to this species as a "kingfish," "ronky," or "Pasadena trout."

The high rate of recognition of the white croaker was unexpected because it is considered an undesirable species by most anglers and it has no particularly unique characters. Many anglers may have become familiar with the white croaker while fishing from private boats or piers. It was the dominant species taken by private boats in southern California from 1975 to 1978 (Wine, 1978, 1979a, 1979b) and is also a common component of the pier fisherman's catch. Although virtually no effort is directed toward this species by CPFV anglers, it still accounted for 3.2% of the catch in 1978 (Collins, CDF&G, pers. commun.).

The white croaker was called a perch by 6% of the anglers, a queenfish by 4%, and a whitefish by 2%.

Ocean whitefish. The ocean whitefish was correctly identified by 40% of those surveyed. Virtually all used the designated common name or simply called it a whitefish.

Although it is a strong fish, can give a good fight on hook and line, and commonly reaches several pounds in weight, it is not highly sought after. Ordinarily, the meat is quite palatable, but at certain times of the year in certain areas, its meat develops an unpleasant taste. The possibility of catching one that tastes bitter has made this species undesirable.

The ocean whitefish is not particularly abundant in the CPFV catch having comprised only 1% of the total in 1978 (Collins, CDF&G, pers. commun.). However, it is taken both on the surface and in deeper water. Its large rounded head and long, unnotched dorsal fin make it difficult to confuse with other species.

The ocean whitefish was called a bass by 5% of the anglers and a croaker by 3%.

Lingcod. The lingcod was correctly identified by 37% of the anglers. Virtually all used the designated common name. This percentage was lower than expected because the lingcod is one of the most highly prized of the incidental species in the rockfish catch. A five fish bag limit for lingcod is currently in effect, although it wasn't at the time the survey was made. Its large size, ability to fight hard when hooked and its flavorful meat have made it a popular species. However, nearly 80% of the lingcod taken in southern California are landed between Santa Monica Bay and Point Conception and they are relatively uncommon to anglers who fish from more southerly parts and to those who fish primarily in the surface waters.

The lingcod was called a bass by 9% of those surveyed, a rockfish by 7%, and a cabezon by 3%.

Halfmoon. The halfmoon was correctly identified by 25% of those surveyed. Only 10% of these used the designated common name. "Blue perch" was used by 55% of the anglers and "Catalina blue perch" was used by the remainder.

The halfmoon is not a major component of the CPFV catch nor is it a highly prized species. It is a shallow water, surface species and is relatively unknown to those who fish deep and exclusively for rockfishes. It is also scarce in the coastal surface catch but occurs around the offshore islands. For this reason, it is often referred to as "Catalina blue perch" and is best known by those who fish the islands.

The halfmoon is not particularly unique in appearance. Although not a member of the perch family, it closely resembles a perch and was called a perch by 13% of those surveyed. It also resembles the blue rockfish (misnamed "blue bass") and was called a bass by 8% of the anglers.

Cabezon. The cabezon was correctly identified by 20% of the anglers, nearly all of whom used the designated common name.

The cabezon is a heavy, wide-bodied species which fights hard when hooked and is considered to be good eating. However, because few are caught it is not well known. It generally makes up less than 0.1% of the annual CPFV catch (Collins, CDF&G, pers. commun.).

The cabezon was called a rockfish by 7% of those surveyed, 6% called it a lingcod, 3% identified it as a black sea bass and 2% referred to it as a bass. The number of misidentifications was particularly high because the photograph used in the survey was old and of poor quality.

Vessel Personnel

Vessel personnel were also included in the survey. When in doubt, most anglers rely on the vessel crew for fish identification and for information about fishing regulations. For this reason, it is important for skippers and deckhands to be able to accurately identify the species caught by the passengers.

A survey of vessel personnel also provided a check on the quality of the photographs used. Anglers occasionally complained about the quality of the photographs; they insisted that they could have correctly identified the fish in question if a better photograph had been used. Some photographs were better than others, but all were of adequate quality for anyone familiar with the species pictured.

Some fishes, particularly rockfishes, have a range of colors and some change color as they mature. Inexperienced anglers were not familiar with all color phases so some felt the photographs were not accurate. The vessel personnel are familiar with most species and with the full range of coloration exhibited by each species. Therefore, the scores

of vessel personnel should approximate the highest scores attainable by thoroughly experienced fishermen.

Angling Experience and Frequency

All vessel personnel indicated that they made more than 30 fishing trips per year, so the angling experience composition of vessel personnel was divided into only 4 angling experience categories rather than the 20 experience/frequency categories used for passengers (the percentage of individuals in each category is shown by the upper value in each column) (Table 6). No weighted values are given because vessel personnel work on a regular schedule, thus precluding a "frequency of use" bias.

Angling experience and angling frequency of vessel personnel exceeds that of the CPFV passengers by a wide margin. While only 3% of the anglers fished 30 or more times each year, 100% of the vessel personnel fit this category. In terms of angling experience, 62% of the passengers have fished for 5 years or less while 38% have fished for 6 or more years. Comparable values for vessel personnel are 30% and 70%, respectively.

Identification Ability

As with the passengers, scores of the vessel personnel were strongly correlated with angling experience, (the average number of correct answers achieved by individuals in each experience category is shown by the lower value in each column, Table 6). As expected, the scores were substantially higher than those of the passengers. The lowest average score achieved by the vessel personnel was higher than the highest average score achieved by the passengers. The most experienced vessel personnel scored 19.5 correct answers, only 2.5 less than perfect. However, the overall average was 18.8, which is substantially above the score of 7.6 correct

answers for all passengers.

TABLE 6. Percentage of Vessel Personnel in 5 Experience Categories and Average Number of Correct Answers Achieved by Each Based on 109 Interviews.

Years Fished (Experience)				
<1	1-5	6-10	10+	TOTAL
11.0 (15.1)	19.3 (18.8)	22.9 (19.0)	46.8 (19.5)	100.0 (18.8)

The differences in scores between the most avid anglers and the vessel personnel are most likely due to angling frequency. Although both groups fished 30 or more times per year, most avid anglers probably make 1-2 fishing trips per week while vessel personnel generally make 5 or more trips per week.

The scores of vessel personnel in identifying the four species with size limits were as follows: barracuda, 100%; kelp bass, 99%; barred sand bass, 95%; and white seabass, 85% (Table 7).

On the rockfishes, vessel personnel scored from a low of 39% for the brown rockfish to a high of 94% for the olive rockfish. Vessel personnel scored lower than 72% correct on only 2 of the 10 rockfishes. Correct identification of rockfishes to at least genus was also high ranging from 72% for the brown rockfish to 99% for the bocaccio.

The remaining species presented few identification problems for vessel personnel. For example, correct identifications ranged from 87% for the halfmoon to 100% for the Pacific bonito.

Results of the survey of vessel personnel indicate that although most passengers may not correctly identify the fish they catch, the knowledge and experience of vessel personnel should insure that all passengers receive

TABLE 7. Percentage of Vessel Personnel Answers in Each of Four Categories Based on 109 Interviews.

	1 Correct I.D.	2 Correct Subgroup	3 Incorrect Answer	4 No Answer
Barracuda	100	-	-	-
Bonito	100	-	-	-
Pacific mackerel	99.1	-	0.9	-
Kelp bass	99.1	-	-	0.9
Sculpin	99.1	-	0.9	-
Ocean whitefish	98.2	-	0.9	0.9
White croaker	96.3	1.8	0.9	0.9
Barred sand bass	94.5	0.9	-	4.6
Olive rockfish	93.6	0.9	1.8	3.7
Lingcod	92.7	-	4.6	2.8
Bocaccio	90.8	8.3	-	0.9
Cabezon	89.0	0.9	3.7	6.4
Cowcod	88.1	8.3	-	3.7
Halfmoon	87.2	-	8.3	4.6
White seabass	85.3	3.7	-	11.0
Flag rockfish	85.3	11.0	-	3.7
Blue rockfish	82.6	3.7	10.1	3.7
Vermilion rockfish	79.8	14.7	0.9	4.6
Chilipepper	78.0	13.8	-	8.3
Copper rockfish	72.5	18.3	1.8	7.3
Greenspotted rockfish	43.1	51.4	1.8	3.7
Brown rockfish	39.4	32.1	14.7	13.8

accurate information regarding their catch.

Results also indicate that many of the complaints about the quality of the survey photographs were the result of passenger inexperience. The photograph of the cabezon, about which most complaints were lodged, was correctly identified by 89% of the vessel personnel. The photographs of the barred sand bass and vermilion rockfish, also sources of some criticism, were correctly identified by 95% and 80% of the vessel personnel, respectively.

APPENDIX I

Common name	Scientific name	Other common names
albacore	*Thunnus alalunga*	longfin, albie, pigfish
bank rockfish	*Sebastes rufus*	bank perch, Florida, Florida red, Louisiana ridge runner
barracuda	*Sphyraena argentea*	barry, log (large), pencils, dinks (small), snake, scooter, skinny, fire hose, stovepipe, alligator gar
barred sand bass	*Paralabrax nebulifer*	sand bass, sandy, grumpy (large)
black & yellow rockfish	*Sebastes chrysomelas*	zurndicky
blue rockfish	*Sebastes mystinus*	blue bass, reef perch, priestfish
bocaccio	*Sebastes paucispinis*	salmon grouper, grouper, slimey, wormy, redfish, sewer salmon, minigrouper (small)
bonito	*Sarda chiliensis*	bone head, micronito or mini-striper (small)
bronzespotted rockfish	*Sebastes gilli*	Arkansas red, warthog
brown rockfish	*Sebastes auriculatus*	chocolate bass, P.D. bass, cinnamon bass, brown bass, ground owl
California halibut	*Paralichthys californicus*	flatty, door mat, flyswatter (small), barn door (large)
canary rockfish	*Sebastes pinniger*	red's, red snapper, red rockfish
chilipepper	*Sebastes goodei*	chili
copper rockfish	*Sebastes vexillaris*	chucklehead, never dies
cowcod	*Sebastes levis*	cow, calf (small), moo's
flag rockfish	*Sebastes rubrivinctus*	barberpole
garibaldi	*Hypsypops rubicundus*	goldfish
giant sea bass	*Stereolepis gigas*	black sea bass, freight train
gopher rockfish	*Sebastes carnatus*	rock bass, spotted rock bass
grass rockfish	*Sebastes rastrelliger*	rock bass, pepper bass, grass bass
greenblotched rockfish	*Sebastes rosenblatti*	boscos, warthogs, starry eyes
greenspotted rockfish	*Sebastes chlorostictus*	boscos, warthogs, starry eyes
greenstriped rockfish	*Sebastes elongatus*	poinsetta, strawberry
hake	*Merluccius productus*	oatmeal fish
halfmoon	*Medialuna californiensis*	Catalina blue perch, Catalina blue, blue wizard, blooper
jack mackerel	*Trachurus symmetricus*	Spanish mackerel, Spaniard
kelp bass	*Paralabrax clathratus*	calico, bull bass (large), police car, checkerboard bass
kelp rockfish	*Sebastes atrovirens*	sugar bass
king salmon	*Oncorhynchus tshawytscha*	tendency to be called silver salmon
lingcod	*Ophiodon elongatus*	ling, greenlinger, gator
Mexican rockfish	*Sebastes macdonaldi*	Arkansas red, Arkansas black, Arkansas traveler, vernon(Dana Pt.)
mola	*Mola mola*	sunfish
ocean whitefish	*Caulolatilus princeps*	whitefish, poor man's yellowtail

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APPENDIX I

Common name	Scientific name	Other common names
albacore	*Thunnus alalunga*	longfin, albie, pigfish
bank rockfish	*Sebastes rufus*	bank perch, Florida, Florida red, Louisiana ridge runner
barracuda	*Sphyraena argentea*	barry, log (large), pencils, dinks (small), snake, scooter, skinny, fire hose, stovepipe, alligater gar
barred sand bass	*Paralabrax nebulifer*	sand bass, sandy, gray (large)
black & yellow rockfish	*Sebastes chrysomelas*	zundicky
blue rockfish	*Sebastes mystinus*	blue bass, reef perch, priestfish
boccaccio	*Sebastes paucispinis*	salmon grouper, grouper, slimy, wormy, redfish, sewer salmon, minigrouper (small)
bonito	*Sarda chiliensis*	bone head, micronito or mini-striper (small)
bronzespotted rockfish	*Sebastes gilli*	Arkansas red, warthog
brown rockfish	*Sebastes auriculatus*	chocolate bass, P.D. bass, cinnamon bass, brown bass, ground owl
California halibut	*Paralichthys californicus*	flatty, door mat, flyswatter (small), barn door (large)
canary rockfish	*Sebastes pinniger*	red's, red snapper, red rockfish
chilipepper	*Sebastes goodei*	chili
copper rockfish	*Sebastes vexillaris*	chucklehead, never dies
cowcod	*Sebastes levis*	cow, calf (small), moo's
flag rockfish	*Sebastes rubrivinctus*	barberpole
garibaldi	*Hypsypops rubicundus*	goldfish
giant sea bass	*Stereolepis gigas*	black sea bass, freight train
gopher rockfish	*Sebastes carnatus*	rock bass, spotted rock bass
grass rockfish	*Sebastes rastrelliger*	rock bass, pepper bass, grass bass
greenblotched rockfish	*Sebastes rosenblatti*	boscos, warthogs, starry eyes
greenspotted rockfish	*Sebastes chlorostictus*	boscos, warthogs, starry eyes
greenstriped rockfish	*Sebastes elongatus*	poinsetta, strawberry
hake	*Merluccius productus*	oatmeal fish
halfmoon	*Medialuna californiensis*	Catalina blue perch, Catalina blue, blue wizard, blooper
jack mackerel	*Trachurus symmetricus*	Spanish mackerel, Spaniard
kelp bass	*Paralabrax clathratus*	calico, bull bass (large), police car, checkerboard bass
kelp rockfish	*Sebastes atrovirens*	sugar bass
king salmon	*Oncorhynchus tshawytscha*	tendency to be called silver salmon
lingcod	*Ophiodon elongatus*	ling, greenlinger, gator
Mexican rockfish	*Sebastes macdonaldi*	Arkansas red, Arkansas black, Arkansas traveler, vernon(Dana Pt.)
mola	*Mola mola*	sunfish
ocean whitefish	*Caulolatilus princeps*	whitefish, poor man's yellowtail

Common name	Scientific name	Other common names
olive rockfish	*Sebastes serranoides*	Johnnie bass, Johnathan's
opaleye	*Girella nigricans*	button perch, Jack Benny
Pacific mackerel	*Scomber japonicus*	greenback, blue mackerel, tiny tuna, green racer, [illegible]-fed, frog
pink rockfish	*Sebastes eos*	boscos, warthogs, starry eyes
queenfish	*Seriphus politus*	herring, sea trout, brown bait
redbanded rockfish	*Sebastes rubrivinctus*	barberpole
rock wrasse	*Halichoeres semicinctus*	iodine fish
rosy rockfish	*Sebastes rosaceus*	strawberry, rinkydink, avocado rockfish
sablefish	*Anoplopoma fimbria*	sable, black cod, butterfish, zipperfish, sea trout
sargo	*Anisotremus davidsonii*	China croaker
senorita	*Oxyjulis californica*	iodine fish
sculpin	*Scorpaena guttata*	rattlesnake, scorpion
sheephead	*Semicossyphus pulcher*	goat, sheepie, billygoats (large)
shortspine thornyhead	*Sebastolobus alascanus*	channel rockfish
silver salmon	*Oncorhynchus kisutch*	
skates & rays	*Rajidae*	tendency to be called rays
speckled rockfish	*Sebastes ovalis*	bellinda cod (So. of Santa Monica Bay), J.W. (No. of Pt. Hueneme), bank perch
spiny dogfish	*Squalus acanthias*	pinback, greeneyed grinner, pinole
splitnose rockfish	*Sebastes diploproa*	channel cod
spotfin croaker	*Roncador stearnsii*	spotty
spotted sand bass	*Paralabrax maculatofasciatus*	bay bass, spotty
squarespot rockfish	*Sebastes hopkinsi*	mustard perch, Belinda bass
swordspine rockfish	*Sebastes ensifer*	hanky panky
treefish	*Sebastes serriceps*	convict bass, lipstick fish
vermilion rockfish	*Sebastes miniatus*	red's, red snapper, red rockfish
white croaker	*Genyonemus lineatus*	tomcod, kingfish, Tommy, butter-bass, Calif. silver bass, Pasadena, sewer trout, bank perch
white sea bass	*Atractoscion nobilis*	white, bull tomcod
widow rockfish	*Sebastes entomelas*	Belinda bass
yellowtail	*Seriola ~~jalmidi~~ lalandi*	yellow, tail, mossback (large), fork tail
yellowtail rockfish	*Sebastes flavidus*	Johnnie bass, Johnathan's
small rockfish	(general term)	crotch cricket, scrub

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REFERENCES

Crooke, Stephen J. 1978. Southern California partyboat sampling study, quarterly report no. 11. Calif. Dept. Fish and Game, Mar. Res. Admin. Rept., 78-15:1-53.

_____. 1979a. Southern California partyboat sampling study, quarterly report no. 12. Calif. Dept. Fish and Game, Mar. Res. Admin. Rept., 79-12:1-67.

_____. 1979b. Southern California commercial passenger fishing vessel sampling study, quarterly report no. 13. Calif. Dept. Fish and Game, Mar. Res. Admin. Rept., 79-15:1-57.

_____. 1979c. Southern California commercial passenger fishing vessel sampling study, quarterly report no. 14. Calif. Dept. Fish and Game, Mar. Res. Admin. Rept., 79-17:1-66.

Gates, Doyle E., and Herbert W. Frey. 1974. Designated common names of certain marine organisms of California. *In* Calif. Dept. Fish and Game, Fish. Bull., (161):55-90.

Miller, Daniel J., and Robert N. Lea. 1972. Guide to the coastal marine fishes of California. Calif. Dept. Fish and Game, Fish Bull., (157):1-235.

Pacific Fishery Management Council. 1979. Fishery management plan and environmental impact statement for the California, Oregon and Washington groundfish fishery. Draft. Nov. 1979. 236 pp.

Roche, Edward T., Ph.D. 1973. Venomous marine fishes of California. Calif. Dept. Fish and Game, Mar. Res. Leaflet, 4:1-11.

Sinclair, William F., and R. W. Morley. 1975. Statistical bias problem in on-site surveys: The severity of the problem and its potential for solution. J. Fish. Res. Bd. Can., 32(12):2520-2524.

Vine, Vickie. 1978. Southern California independent sport fishing survey, annual report no. 2. Calif. Dept. Fish and Game, Mar. Res. Admin. Rept., 78-2:1-79.

_____. 1979a. Southern California independent sport fishing survey, annual report no. 3. Calif. Dept. Fish and Game, Mar. Res. Admin. Rept., 79-3:1-100.

_____. 1979b. Southern California marine sportfishing: private boat catch and effort, 1975-1976. Calif. Dept. Fish and Game, Mar. Res. Admin. Rept., 79-11:1-60.

_____. 1979c. Preliminary report on the ability of marine recreational fishermen to identify the more commonly caught sportfish. Calif. Dept. Fish and Game, Mar. Res. Admin. Rept., 79-14:1-28.